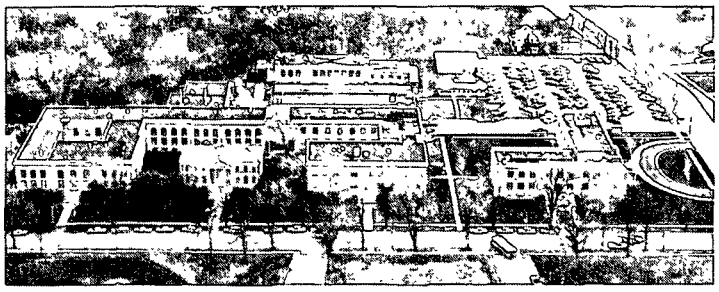

THE INSTITUTE OF PAPER CHEMISTRY, APPLETON, WISCONSIN

PERMANENCE OF COATED PAPER FOR PRINTED LIBRARY MATERIALS

Project 3655

Report Two

A Progress Report

to

NATIONAL INFORMATION STANDARDS ORGANIZATION

June 30, 1989

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THE INSTITUTE OF PAPER CHEMISTRY

Appleton, Wisconsin

PERMANENCE OF COATED PAPER FOR PRINTED LIBRARY MATERIALS

Project 3655

by

Roger H. Van Eperen

Report Two

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June 30, 1989

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THE INSTITUTE OF PAPER CHEMISTRY

Appleton, Wisconsin

PERMANENCE OF COATED PAPER FOR PRINTED LIBRARY MATERIALS

SUMMARY

Coated papers intended for printed library materials were subjected to accelerated ageing at 90°C and 50% RH. The papers were then tested for various properties to show the effect of this aging on these properties. The properties included folding endurance, tensile strength, and tear resistance.

Progress Report One presented the results for unaged samples, and for samples aged for 17, 120 and 168 hours. This report presents data for an additional aging time of 288 hours.

INTRODUCTION

Papers intended for the library market are expected to have sufficient longevity so as to last several hundred years under normal conditions of library circulation and storage without significant deterioration. The NISO-developed American National Standard for Permanence of Paper for Printed Library Materials (Z39.48) was published in 1984. The standard sets the criteria for permanence of uncoated papers. The standard is being revised to encompass coated papers. This study was undertaken to develop base-line data for the NISO Standards Committee to use in establishing criteria for coated papers.

Progress Report One, January 5, 1989, presents the results of a defined set of tests on 11 coated and 2 uncoated paper samples supplied by NISO. The tests were made for unaged samples, and for samples which had been subjected to accelerated aging at 90°C, 50% RH, for periods of 17, 120, and 168 hours.

After reviewing the results in Report One, the NISO Standards Committee requested that the base-line be extended to include data for an additional aging period of 288 hours. The results of this extended study, along with a summary of the data for all aging periods, are included in this report.

PROCEDURES

The test procedures used for the first part of this study are given in Report One, and are repeated below for completeness of this report.

The ~~184~~ paper sheets provided for each of the ~~11~~ coated and ~~2~~ 4 alkaline aged uncoated samples ~~were~~ was randomly divided into ~~4~~ 6 groups of 46 sheets each. One group was selected as the control, or unaged, sample. The remaining ~~3~~ 5 groups were exposed to accelerated aging in a circulating oven controlled at 90°C and 50% RH. The groups were removed from the oven after aging periods of 17, 120, ~~and~~ 288, and 576 168 hours, respectively. All ~~4~~ 6 groups were then preconditioned at 15% RH, 23°C, and then conditioned at 50% RH, 23°C, before testing. The testing for each of the ~~13~~ 4 samples was completed within two weeks after aging.

It is known that volatiles given off by one sample can sometimes affect the aging rate of other samples. Hence, each of the ~~13~~ 4 samples was exposed in the aging chamber independently.

Following aging, 14 sheets were selected from each group for fold and tensile testing. The sheets were cut so that 1 MD tensile, 1 CD tensile, 6 MD fold, and 6 CD fold tests could be made on each sheet. The tensile strength tests were made in accordance with TAPPI method T 494 om-81. The folding endurance tests were made with the MIT tester in accordance with TAPPI method T 511 om-83.

The remaining 32 sheets of each group were used for tear testing. The sheets were cut so that 10 MD and 10 CD tests could be made. The tests were made in accordance with TAPPI method T414 om-82, using a 1600 g pendulum.

The unused portions of the sheets which had been aged for 168 hours were selected for this extended study. These were exposed to accelerated aging for an additional time of 120 hours, or a total of 288 hours. The test procedures for this additional aging period were the same as described above.

TEST RESULTS

The test results are given in Tables I through ~~VIII~~ IV and in the appendix. Table I is a summary table of all test data showing average results only. The averages and standard deviations for each type of test are summarized in Tables II through ~~VIII~~ IV, respectively. Standard deviations were calculated from:

$$s = [(N \Sigma(x)^2 - (\Sigma x)^2)/(N(N-1))]^{1/2}$$

The individual test results for all test types ~~for the 288-hour aging time~~ are given in the appendix. ~~The individual test results for unaged sample, and for samples aged 17, 120, and 168 hours are given in Report One.~~ The tensile test results include stretch, tensile energy absorption, and tensile stiffness, in addition to tensile strength. These properties were not requested but are automatically reported by our data acquisition system.

Table 1. Data Summary.

Paper	Treatment	Log10 Fold Tear, mN MD	Log10 Fold Tear, mN CD	Tensile, kN/m MD	Tensile, kN/m CD	pH	Alkaline Reserve %
A	Control	2.72	2.19	452	531	5.41	2.83	8.19	3.10
	90°C Aged 17 hrs	2.66	2.25	421	506	5.80	2.77	----	----
	50% RH Aged 120 hrs	2.64	2.14	433	509	5.86	2.71	----	----
	Aged 168 hrs	2.64	2.06	420	522	5.84	2.74	----	----
	Aged 288 hrs	2.36	2.04	346	414	5.73	2.68	----	----
B	Control	2.26	1.92	361	437	5.78	2.85	8.40	5.70
	90°C Aged 17 hrs	2.17	1.85	349	414	5.91	2.85	----	----
	50% RH Aged 120 hrs	2.11	1.81	358	421	5.82	2.78	----	----
	Aged 168 hrs	1.99	1.74	356	437	5.78	2.75	----	----
	Aged 288 hrs	1.95	1.62	344	418	5.76	2.76	----	----
C	Control	2.70	2.18	454	537	5.97	2.73	8.25	2.20
	90°C Aged 17 hrs	2.66	2.19	440	534	6.07	2.82	----	----
	50% RH Aged 120 hrs	2.58	2.00	428	520	5.82	2.63	----	----
	Aged 168 hrs	2.55	1.91	433	523	5.72	2.61	----	----
	Aged 288 hrs	2.40	1.87	396	485	5.71	2.54	----	----
D	Control	2.48	2.04	392	468	5.38	2.45	9.11	6.49
	90°C Aged 17 hrs	2.32	2.02	399	456	5.28	2.47	----	----
	50% RH Aged 120 hrs	2.34	1.96	393	471	5.20	2.47	----	----
	Aged 168 hrs	2.25	2.02	396	464	5.13	2.41	----	----
	Aged 288 hrs	2.20	1.96	392	439	5.15	2.42	----	----
E	Control	2.71	1.96	428	559	6.50	2.30	9.15	5.19
	90°C Aged 17 hrs	2.70	1.94	433	566	6.63	2.33	----	----
	50% RH Aged 120 hrs	2.69	1.88	423	564	6.41	2.30	----	----
	Aged 168 hrs	2.66	1.86	428	570	6.51	2.21	----	----
	Aged 288 hrs	2.65	1.86	428	540	6.65	2.17	----	----
F	Control	1.91	1.32	724	822	5.84	2.52	5.68	0.00
	90°C Aged 17 hrs	1.77	1.30	633	753	5.99	2.54	----	----
	50% RH Aged 120 hrs	1.41	1.13	486	571	5.43	2.19	----	----
	Aged 168 hrs	1.20	1.04	426	511	5.30	2.28	----	----
	Aged 288 hrs	1.03	0.96	361	452	5.03	2.16	----	----
G	Control	1.79	1.38	545	600	4.88	2.55	9.00	6.40
	90°C Aged 17 hrs	1.75	1.40	522	581	5.07	2.45	----	----
	50% RH Aged 120 hrs	1.72	1.43	523	576	5.01	2.55	----	----
	Aged 168 hrs	1.73	1.40	527	564	5.01	2.42	----	----
	Aged 288 hrs	1.75	1.44	543	590	4.91	2.35	----	----
H	Control	2.70	2.28	304	399	6.62	2.56	6.84	0.10
	90°C Aged 17 hrs	2.62	2.24	306	388	6.72	2.53	----	----
	50% RH Aged 120 hrs	2.36	2.01	260	347	6.25	2.39	----	----
	Aged 168 hrs	2.17	1.86	247	334	6.08	2.36	----	----
	Aged 288 hrs	1.79	1.64	226	304	5.68	2.24	----	----
I	Control	2.42	2.04	329	435	5.38	2.12	8.50	9.57
	90°C Aged 17 hrs	2.30	1.92	316	401	5.46	2.12	----	----
	50% RH Aged 120 hrs	2.28	1.84	304	405	5.50	2.13	----	----
	Aged 168 hrs	2.28	1.81	320	401	5.44	2.08	----	----
	Aged 288 hrs	2.11	1.73	295	370	5.46	2.08	----	----
J	Control	2.69	2.02	377	489	6.38	2.75	6.95	0.07
	90°C Aged 17 hrs	2.59	2.00	364	484	6.45	3.01	----	----
	50% RH Aged 120 hrs	2.42	1.91	348	461	6.14	2.54	----	----
	Aged 168 hrs	2.45	1.80	347	433	6.18	2.54	----	----
	Aged 288 hrs	2.15	1.64	301	390	5.97	2.51	----	----
K	Control	1.86	2.16	417	370	3.99	2.84	9.05	11.27
	90°C Aged 17 hrs	1.74	2.16	429	362	4.00	2.98	----	----
	50% RH Aged 120 hrs	1.64	2.04	408	377	3.94	2.84	----	----
	Aged 168 hrs	1.71	2.08	408	382	4.02	2.72	----	----
	Aged 288 hrs	1.60	1.97	366	399	3.96	2.85	----	----
L	Control	2.36	2.36	427	458	4.90	2.38	9.14	10.13
	90°C Aged 17 hrs	2.22	2.26	443	457	4.44	2.12	----	----
	50% RH Aged 120 hrs	2.24	2.17	428	479	4.68	2.20	----	----
	Aged 168 hrs	2.20	2.16	434	464	4.85	2.25	----	----
	Aged 288 hrs	2.16	2.16	402	430	4.80	2.26	----	----
M	Control	2.40	2.01	401	489	5.36	2.02	9.11	6.57
	90°C Aged 17 hrs	2.35	1.94	406	494	5.33	1.99	----	----
	50% RH Aged 120 hrs	2.31	1.82	395	483	5.34	1.96	----	----
	Aged 168 hrs	2.26	1.88	388	493	5.34	2.00	----	----
	Aged 288 hrs	2.13	1.81	385	461	5.46	2.04	----	----

Table 2. Summary of MD tensile data.

Sample Code	MD Tensile Strength, kN/m Unaged	Aged 17 hours	Aged 120 hours	Aged 168 hours	Aged 288 hours
A - Average	5.41	5.80	5.86	5.84	5.73
Std. Dev.	0.259	0.213	0.212	0.280	0.255
B - Average	5.78	5.91	5.82	5.78	5.76
Std. Dev.	0.251	0.277	0.340	0.315	0.218
C - Average	5.97	6.07	5.82	5.72	5.71
Std. Dev.	0.245	0.217	0.274	0.140	0.261
D - Average	5.38	5.28	5.20	5.13	5.15
Std. Dev.	0.198	0.126	0.178	0.231	0.278
E - Average	6.50	6.63	6.41	6.51	6.65
Std. Dev.	0.241	0.221	0.225	0.337	0.176
F - Average	5.84	5.99	5.43	5.30	5.03
Std. Dev.	0.241	0.197	0.240	0.245	0.238
G - Average	4.88	5.07	5.01	5.01	4.91
Std. Dev.	0.190	0.186	0.197	0.224	0.181
H - Average	6.62	6.72	6.25	6.08	5.68
Std. Dev.	0.193	0.274	0.202	0.231	0.161
I - Average	5.38	5.46	5.50	5.44	5.46
Std. Dev.	0.241	0.188	0.222	0.215	0.269
J - Average	6.38	6.45	6.14	6.18	5.97
Std. Dev.	0.160	0.188	0.278	0.216	0.204
K - Average	3.99	4.00	3.94	4.02	3.96
Std. Dev.	0.190	0.150	0.200	0.171	0.73
L - Average	4.90	4.44	4.68	4.85	4.80
Std. Dev.	0.651	1.316	0.367	0.439	0.358
M - Average	5.36	5.33	5.34	5.34	5.46
Std. Dev.	0.157	0.149	0.214	0.226	0.216

Table 3. Summary of CD tensile data.

Sample Code	CD Tensile Strength, kN/m Unaged	Aged 17 hours	Aged 120 hours	Aged 168 hours	Aged 288 hours
A - Average	2.83	2.77	2.71	2.74	2.68
Std. Dev.	0.075	0.070	0.076	0.109	0.140
B - Average	2.85	2.85	2.78	2.75	2.76
Std. Dev.	0.144	0.107	0.112	0.089	0.117
C - Average	2.73	2.82	2.63	2.61	2.54
Std. Dev.	0.068	0.078	0.100	0.095	0.111
D - Average	2.45	2.47	2.47	2.41	2.42
Std. Dev.	0.102	0.112	0.099	0.078	0.062
E - Average	2.30	2.33	2.30	2.21	2.17
Std. Dev.	0.138	0.157	0.118	0.159	0.151
F - Average	2.52	2.54	2.19	2.28	2.16
Std. Dev.	0.155	0.070	0.191	0.063	0.059
G - Average	2.55	2.45	2.55	2.42	2.35
Std. Dev.	0.090	0.086	0.072	0.075	0.082
H - Average	2.56	2.53	2.39	2.36	2.24
Std. Dev.	0.076	0.097	0.100	0.051	0.091
I - Average	2.12	2.12	2.13	2.08	2.08
Std. Dev.	0.093	0.113	0.094	0.073	0.082
J - Average	2.75	3.01	2.54	2.54	2.51
Std. Dev.	0.063	0.061	°0.082	0.055	0.082
K - Average	2.84	2.98	2.84	2.72	2.85
Std. Dev.	0.157	0.161	0.137	0.156	0.146
L - Average	2.38	2.12	2.20	2.25	2.26
Std. Dev.	0.155	0.154	0.132	0.196	0.172
M - Average	2.02	1.99	1.96	2.00	2.04
Std. Dev.	0.073	0.074	0.048	0.048	0.082

Table 4. Summary of MD tear data

Sample Code	Tear Resistance, mN Unaged	Aged 17 hours	Aged 120 hours	Aged 168 hours	Aged 288 hours
A - Average	451.9	421.3	433.1	419.7	346.0
Std. Dev.	29.9	16.6	19.1	14.0	24.7
B - Average	360.9	349.1	357.8	356.2	343.6
Std. Dev.	9.1	7.6	9.9	18.2	8.1
C - Average	453.5	440.1	427.7	433.1	396.2
Std. Dev.	8.9	17.1	14.8	14.7	16.2
D - Average	392.3	399.3	393.1	396.2	391.5
Std. Dev.	9.1	13.0	9.4	11.2	8.6
E - Average	427.6	433.1	422.9	427.6	427.6
Std. Dev.	10.6	17.7	12.0	16.2	36.8
F - Average	724.1	633.1	485.6	426.0	360.9
Std. Dev.	26.9	21.6	27.8	16.1	14.3
G - Average	545.3	521.7	523.3	527.2	542.9
Std. Dev.	14.0	13.5	11.1	13.2	14.2
H - Average	304.4	306.0	260.5	247.3	225.9
Std. Dev.	8.9	9.1	10.3	9.9	8.9
I - Average	328.7	316.2	304.4	320.1	295.0
Std. Dev.	13.6	14.3	7.2	9.6	9.2
J - Average	376.6	363.6	348.3	346.8	301.3
Std. Dev.	9.1	20.6	9.2	33.9	14.9
K - Average	417.4	429.2	408.0	408.0	366.4
Std. Dev.	12.7	11.1	10.5	12.3	10.5
L - Average	426.8	443.3	427.6	433.9	402.5
Std. Dev.	13.4	12.9	15.8	13.9	10.5
M - Average	400.9	406.4	395.4	387.6	385.3
Std. Dev.	5.8	12.2	9.9	11.8	7.4

Table 5. Summary of CD tear data.

Sample Code	Tear Resistance, mN Unaged	Aged 17 hours	Aged 120 hours	Aged 168 hours	Aged 288 hours
A - Average	531.1	506.0	509.2	521.7	414.2
Std. Dev.	14.3	14.4	14.5	11.8	23.6
B - Average	437.0	414.2	421.3	437.0	418.2
Std. Dev.	12.8	7.2	9.8	19.6	17.0
C - Average	537.4	533.5	520.2	523.3	484.8
Std. Dev.	19.3	8.3	11.1	12.3	9.6
D - Average	468.4	455.8	470.7	463.7	438.6
Std. Dev.	13.4	10.1	17.7	10.8	10.1
E - Average	559.4	565.7	564.1	569.6	539.8
Std. Dev.	12.3	14.1	13.0	12.4	16.5
F - Average	822.2	753.2	571.2	510.7	451.9
Std. Dev.	18.4	16.1	11.0	19.7	23.7
G - Average	600.2	580.6	575.9	564.1	590.0
Std. Dev.	15.4	14.3	11.2	16.7	15.6
H - Average	399.3	388.4	346.8	334.2	303.6
Std. Dev.	6.9	16.2	7.2	5.5	22.2
I - Average	434.6	400.9	404.6	400.9	370.3
Std. Dev.	21.9	9.4	13.3	11.4	9.6
J - Average	488.8	484.1	461.3	433.1	389.9
Std. Dev.	12.2	11.1	7.2	8.9	21.3
K - Average	369.5	361.7	376.6	381.7	399.3
Std. Dev.	12.5	12.5	14.8	7.9	8.6
L - Average	458.2	456.6	478.6	463.7	429.9
Std. Dev.	24.3	11.0	26.7	16.3	16.5
M - Average	488.8	493.5	483.3	492.7	461.3
Std. Dev.	13.9	7.8	12.4	8.1	12.2

Table 6. Summary of MD MIT fold data.

Sample Code	Unaged	Aged 17 hours	Aged 120 hours	Aged 168 hours	Aged 288 hours
			$\log_{10}$ MD Folding Endurance		
A - Average	2.718	2.662	2.639	2.639	2.362
Std. Dev.	0.042	0.045	0.038	0.056	0.109
B - Average	2.255	2.166	2.110	1.988	1.950
Std. Dev.	0.053	0.070	0.91	0.115	0.113
C - Average	2.696	2.655	2.580	2.546	2.401
Std. Dev.	0.036	0.054	0.056	0.057	0.092
D - Average	2.481	2.319	2.337	2.250	2.205
Std. Dev.	0.038	0.036	0.060	0.093	0.110
E - Average	2.711	2.700	2.687	2.659	2.648
Std. Dev.	0.057	0.053	0.033	0.076	0.051
F - Average	1.914	1.768	1.412	1.198	1.033
Std. Dev.	0.048	0.047	0.072	0.077	0.043
G - Average	1.792	1.748	1.721	1.726	1.753
Std. Dev.	0.068	0.053	0.059	0.034	0.044
H - Average	2.699	2.621	2.365	2.168	1.788
Std. Dev.	0.044	0.055	0.061	0.096	0.064
I - Average	2.415	2.305	2.284	2.275	2.111
Std. Dev.	0.090	0.104	0.081	0.084	0.063
J - Average	2.693	2.587	2.420	2.450	2.147
Std. Dev.	0.060	0.069	0.104	0.037	0.065
K - Average	1.855	1.740	1.635	1.713	1.597
Std. Dev.	0.125	0.096	0.105	0.140	0.090
L - Average	2.357	2.223	2.241	2.204	2.165
Std. Dev.	0.153	0.071	0.109	0.087	0.072
M - Average	2.397	2.346	2.314	2.258	2.125
Std. Dev.	0.057	0.078	0.058	0.060	0.046

Table 7. Summary of CD MIT fold data.

Sample Code	Unaged	$\log_{10}$ CD Folding Endurance Aged 17 hours	Aged 120 hours	Aged 168 hours	Aged 288 hours
A - Average	2.191	2.254	2.138	2.056	2.045
Std. Dev.	0.089	0.059	0.053	0.089	0.097
B - Average	1.915	1.851	1.812	1.738	1.618
Std. Dev.	0.114	0.179	0.115	0.091	0.115
C - Average	2.181	2.188	1.997	1.907	1.870
Std. Dev.	0.059	0.074	0.069	0.111	0.072
D - Average	2.038	2.024	1.959	2.015	1.964
Std. Dev.	0.102	0.081	0.077	0.061	0.063
E - Average	1.965	1.941	1.876	1.856	1.855
Std. Dev.	0.047	0.041	0.078	0.070	0.054
F - Average	1.324	1.299	1.131	1.043	0.965
Std. Dev.	0.037	0.049	0.043	0.035	0.031
G - Average	1.375	1.403	1.431	1.397	1.435
Std. Dev.	0.055	0.070	0.073	0.069	0.027
H - Average	2.285	2.237	2.011	1.860	1.635
Std. Dev.	0.075	0.126	0.094	0.129	0.064
I - Average	2.042	1.922	1.835	1.813	1.727
Std. Dev.	0.159	0.097	0.125	0.095	0.065
J - Average	2.019	2.000	1.913	1.796	1.642
Std. Dev.	0.100	0.106	0.098	0.116	0.055
K - Average	2.156	2.162	2.035	2.075	1.966
Std. Dev.	0.075	0.059	0.073	0.071	0.111
L - Average	2.365	2.260	2.171	2.158	2.160
Std. Dev.	0.101	0.083	0.087	0.088	0.042
M - Average	2.009	1.938	1.821	1.884	1.810
Std. Dev.	0.087	0.068	0.079	0.056	0.067

THE INSTITUTE OF PAPER CHEMISTRY

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APPENDIX

Sample A-MD Aged 288 hours

Specimen Number	Tensile Strength (kN/m)	% Stretch (%)	Tensile Energy Absorption (J/m^2)	Tensile Stiffness (ET) (kN/m)
1	5.898	1.435	54.60	744.5
2	5.759	1.448	54.10	740.2
3	5.703	1.402	51.22	747.2
4	5.694	1.511	55.66	716.3
5	6.033	1.595	62.17	725.5
6	5.790	1.485	55.75	728.2
7	5.659	1.436	52.78	738.9
8	6.098	1.627	64.22	723.9
9	5.859	1.467	55.89	777.6
10	5.399	1.415	48.81	697.9
11	6.063	1.586	62.53	730.9
12	5.260	1.331	45.44	756.4
13	5.472	1.465	51.95	699.0
14	5.503	1.329	47.17	737.5
Mean:	5.728	1.467	54.45	733.1
Standard Deviation:	.255	.090	5.62	21.1

Sample A-CD Aged 288 hours

Specimen Number	Tensile Strength (kN/m)	% Stretch (%)	Tensile Energy Absorption (J/m^2)	Tensile Stiffness (ET) (kN/m)
1	2.774	3.167	66.94	406.1
2	2.864	3.644	80.03	367.4
3	2.663	3.119	62.76	360.7
4	2.679	3.062	62.04	385.9
5	2.670	2.903	58.50	372.4
6	2.673	2.823	57.23	373.1
7	2.835	3.486	75.07	359.0
8	2.715	3.257	67.19	360.7
9	2.500	2.268	42.61	388.2
10	2.616	2.860	57.87	402.5
11	2.734	3.043	63.03	379.1
12	2.877	3.420	74.37	368.9
13	2.644	2.952	58.86	364.6
14	2.350	2.086	36.77	370.0
Mean:	2.685	3.006	61.66	375.6
Standard Deviation:	.140	.427	11.68	15.0

Sample B-MD Aged 288 hours

Specimen Number	Tensile Strength (kN/m)	% Stretch (%)	Tensile Energy Absorption (J/m^2)	Tensile Stiffness (ET) (kN/m)
1	5.603	1.315	46.94	734.7
2	5.668	1.315	47.57	755.5
3	6.137	1.545	61.51	746.1
4	5.811	1.348	50.10	766.7
5	5.846	1.364	51.08	744.5
6	5.464	1.217	41.93	747.9
7	5.655	1.401	50.56	709.8
8	5.924	1.428	54.78	749.6
9	5.855	1.452	55.43	757.4
10	6.215	1.511	61.26	758.1
11	5.659	1.250	44.46	761.9
12	5.551	1.381	49.35	704.9
13	5.703	1.255	45.43	768.4
14	5.585	1.320	47.36	747.2
Mean:	5.763	1.364	50.55	746.6
Standard Deviation:	.218	.097	5.87	19.0

Sample B-CD Aged 288 hours

Specimen Number	Tensile Strength (kN/m)	% Stretch (%)	Tensile Energy Absorption (J/m^2)	Tensile Stiffness (ET) (kN/m)
1	2.612	2.335	45.45	395.0
2	2.708	3.039	62.88	360.9
3	2.743	3.219	66.91	376.1
4	2.937	3.332	73.48	388.3
5	2.559	2.788	53.78	361.6
6	2.748	2.779	57.06	372.5
7	2.823	3.333	70.95	355.9
8	2.781	3.296	70.19	375.0
9	2.925	3.185	69.80	415.1
10	2.779	3.653	77.59	391.6
11	2.849	3.090	66.34	404.6
12	2.602	2.696	52.70	359.6
13	2.734	3.303	67.98	349.2
14	2.890	3.220	69.61	374.4
Mean:	2.764	3.091	64.62	377.1
Standard Deviation:	.117	.337	9.10	19.5

Sample C-MD Aged 288 hours

Specimen Number	Tensile Strength (kN/m)	% Stretch (%)	Tensile Energy Absorption (J/m^2)	Tensile Stiffness (ET) (kN/m)
1	5.603	1.451	52.93	732.0
2	5.759	1.438	53.52	725.5
3	6.233	1.543	62.10	762.9
4	5.855	1.507	56.89	721.2
5	5.885	1.465	55.61	740.2
6	5.451	1.306	45.32	739.6
7	5.607	1.460	52.35	699.5
8	6.020	1.500	58.66	747.2
9	5.390	1.338	46.45	735.3
10	5.716	1.405	51.36	730.4
11	5.920	1.477	56.67	740.7
12	5.494	1.402	49.40	712.0
13	5.724	1.364	49.95	734.7
14	5.286	1.279	42.97	728.8
Mean:	5.710	1.424	52.44	732.2
Standard Deviation:	.261	.079	5.36	15.3

Sample C-CD Aged 288 hours

Specimen Number	Tensile Strength (kN/m)	% Stretch (%)	Tensile Energy Absorption (J/m^2)	Tensile Stiffness (ET) (kN/m)
1	2.661	3.126	63.10	372.5
2	2.757	3.137	65.67	374.2
3	2.611	3.289	66.30	346.4
4	2.508	2.774	52.44	364.6
5	2.381	2.390	43.50	387.8
6	2.529	2.772	53.48	365.0
7	2.546	2.718	52.14	358.8
8	2.619	3.121	62.29	332.5
9	2.428	2.498	45.62	363.8
10	2.381	2.361	43.14	410.7
11	2.432	2.463	45.64	413.5
12	2.546	2.803	54.78	404.3
13	2.647	3.147	63.47	385.1
14	2.559	2.903	56.46	352.2
Mean:	2.543	2.822	54.86	373.7
Standard Deviation:	.111	.311	8.32	24.2

Sample D-MD Aged 288 hours

Specimen Number	Tensile Strength (kN/m)	% Stretch (%)	Tensile Energy Absorption (J/m^2)	Tensile Stiffness (ET) (kN/m)
1	5.2080	1.46400	51.51000	774.3
2	5.3340	1.34300	47.71000	803.8
3	4.9340	1.42600	47.77000	746.5
4	4.8560	1.22500	39.64000	783.8
5	5.0380	1.38200	46.88000	770.4
6	5.3730	1.51100	54.91000	761.0
7	5.0860	1.36700	46.85000	765.8
8	4.9770	1.24000	41.23000	799.0
9	5.0730	1.37000	46.67000	773.2
10	5.3730	1.40900	50.85000	798.7
11	4.8380	1.32400	43.02000	756.4
12	4.7170	1.15300	36.08000	789.4
13	5.3810	1.42600	51.12000	789.5
14	5.2640	1.37800	48.62000	782.6
Mean:	5.151	1.26900	43.52000	637.7
Standard Deviation:	0.278	.35730	13.03000	544.4

Sample D-CD Aged 288 hours

Specimen Number	Tensile Strength (kN/m)	% Stretch (%)	Tensile Energy Absorption (J/m^2)	Tensile Stiffness (ET) (kN/m)
1	2.364	3.248	64.25	431.8
2	2.421	4.238	86.19	426.0
3	2.467	4.204	86.25	439.5
4	2.423	4.045	81.29	439.0
5	2.293	3.383	65.11	434.9
6	2.430	3.368	69.25	432.7
7	2.369	4.053	80.16	420.6
8	2.427	4.009	80.89	429.4
9	2.527	3.918	82.08	438.7
10	2.444	3.573	72.62	448.1
11	2.378	3.107	61.23	442.3
12	2.411	4.042	80.80	421.9
13	2.489	4.165	87.00	417.8
14	2.505	4.622	95.80	422.6
Mean:	2.425	3.855	78.07	431.8
Standard Deviation:	.062	.444	10.09	9.2

Sample E-MD Aged 288 hours

Specimen Number	Tensile Strength (kN/m)	% Stretch (%)	Tensile Energy Absorption (J/m^2)	Tensile Stiffness (ET) (kN/m)
1	6.567	1.641	71.71	871.9
2	6.693	1.652	73.08	869.8
3	6.572	1.611	69.90	861.6
4	7.032	1.680	78.27	880.1
5	6.541	1.641	71.12	866.0
6	6.593	1.552	67.49	865.4
7	6.797	1.630	73.07	864.3
8	6.802	1.595	71.17	866.0
9	6.580	1.619	70.56	861.6
10	6.546	1.398	59.83	896.9
11	6.541	1.595	68.67	849.7
12	6.619	1.451	62.66	886.6
13	6.863	1.740	78.92	842.7
14	6.320	1.386	56.85	841.0
Mean:	6.648	1.585	69.52	866.0
Standard Deviation:	.176	.104	6.25	15.4

Sample E-CD Aged 288 hours

Specimen Number	Tensile Strength (kN/m)	% Stretch (%)	Tensile Energy Absorption (J/m^2)	Tensile Stiffness (ET) (kN/m)
1	2.074	3.670	63.32	404.0
2	2.366	3.026	59.02	447.0
3	2.103	4.086	70.84	395.1
4	2.102	1.890	31.64	441.4
5	2.098	3.571	62.24	418.6
6	2.213	2.486	44.77	434.9
7	2.003	3.124	51.69	404.0
8	2.074	1.621	26.45	437.6
9	2.057	3.435	58.34	407.2
10	2.395	3.468	67.26	430.2
11	1.980	2.894	47.27	407.2
12	2.392	3.358	66.09	417.3
13	2.112	3.892	68.27	393.3
14	2.381	3.324	64.49	418.3
Mean:	2.168	3.132	55.83	418.3
Standard Deviation:	.151	.711	13.77	17.5

Sample F-MD Aged 288 hours

Specimen Number	Tensile Strength (kN/m)	% Stretch (%)	Tensile Energy Absorption (J/m^2)	Tensile Stiffness (ET) (kN/m)
1	4.806000	1.04500	31.900000	732.3000
Excluded	.003911	.01144	.000223	-.7603
3	5.053000	.99360	31.190000	791.8000
4	5.284000	1.06200	35.550000	798.2000
5	4.849000	.98760	30.190000	765.2000
6	5.236000	1.05200	35.020000	789.0000
7	4.780000	1.01900	30.490000	738.6000
8	5.184000	1.05500	34.650000	791.8000
9	5.271000	1.01000	33.520000	819.0000
10	5.053000	1.05800	33.970000	780.4000
11	5.058000	.99600	31.560000	787.4000
12	4.441000	.87780	24.050000	731.7000
13	5.219000	1.05900	35.170000	786.1000
14	5.158000	.97730	31.430000	806.9000
15	5.058000	1.03200	32.870000	779.8000
Mean:	5.032000	1.01600	32.2500000	778.4000
Standard Deviation:	.237900	.04971	2.9720000	27.0800

Sample F-CD Aged 288 hours

Specimen Number	Tensile Strength (kN/m)	% Stretch (%)	Tensile Energy Absorption (J/m^2)	Tensile Stiffness (ET) (kN/m)
1	2.220	2.880	51.16	314.2
2	2.126	2.722	45.83	303.4
3	2.188	2.721	46.91	314.8
4	2.247	2.810	51.69	333.7
5	2.059	1.868	29.03	314.0
6	2.141	2.371	39.95	313.4
7	2.218	2.384	42.09	326.0
8	2.108	2.057	34.17	320.7
9	2.101	2.372	39.33	309.8
10	2.169	2.573	44.28	306.7
11	2.119	2.572	43.58	304.9
12	2.199	2.535	44.25	311.0
13	2.256	2.916	52.01	317.8
14	2.138	2.211	36.87	317.5
Mean:	2.163	2.499	42.94	314.9
Standard Deviation:	.059	.310	6.71	8.2

Sample G-MD Aged 288 hours

Specimen Number	Tensile Strength (kN/m)	% Stretch (%)	Tensile Energy Absorption (J/m^2)	Tensile Stiffness (ET) (kN/m)
1	5.173	1.769	61.57	614.4
2	4.773	1.563	49.29	617.9
3	4.939	1.690	55.79	607.6
4	4.795	1.563	49.65	616.3
5	5.091	1.770	60.13	612.5
6	5.065	1.822	62.25	600.6
7	4.991	1.806	60.99	598.9
8	4.843	1.507	48.35	627.2
9	5.052	1.706	57.73	619.6
10	5.038	1.798	60.53	600.0
11	4.965	1.698	56.56	612.5
12	4.817	1.643	52.82	600.0
13	4.634	1.492	45.64	600.6
14	4.547	1.526	49.46	574.5
Mean:	4.909	1.675	55.05	607.3
Standard Deviation:	.181	.112	5.73	13.0

Sample G-CD Aged 288 hours

Specimen Number	Tensile Strength (kN/m)	% Stretch (%)	Tensile Energy Absorption (J/m^2)	Tensile Stiffness (ET) (kN/m)
1	2.364	4.256	81.01	272.8
2	2.324	3.779	70.18	280.6
3	2.330	3.450	64.02	287.6
4	2.288	3.809	69.44	279.2
5	2.187	3.363	58.34	272.2
6	2.486	4.351	86.55	277.9
7	2.385	3.887	73.95	304.5
8	2.274	3.351	60.24	286.3
9	2.378	3.941	73.94	279.8
10	2.342	4.054	76.14	276.8
11	2.465	3.977	79.34	305.0
12	2.370	3.846	72.83	283.3
13	2.264	3.362	59.92	290.3
14	2.436	4.579	88.91	271.1
Mean:	2.349	3.857	72.49	283.4
Standard Deviation:	.082	.383	9.60	10.7

Sample H-MD Aged 288 hours

Specimen Number	Tensile Strength (kN/m)	% Stretch (%)	Tensile Energy Absorption (J/m^2)	Tensile Stiffness (ET) (kN/m)
1	5.760	1.274	47.97	877.5
2	5.656	1.241	46.22	867.8
3	5.725	1.292	48.37	873.5
4	5.825	1.337	51.00	857.3
5	5.786	1.311	49.90	870.9
6	5.669	1.229	45.27	873.5
7	5.564	1.206	44.18	874.6
8	5.625	1.299	48.21	848.8
9	5.812	1.315	50.44	864.7
10	5.673	1.232	45.74	876.6
11	5.582	1.269	46.28	855.3
12	5.260	1.137	39.00	860.2
13	5.660	1.330	49.97	851.9
14	5.951	1.278	49.96	897.6
Mean:	5.682	1.268	47.32	867.9
Standard Deviation:	.161	.055	3.22	12.8

Sample H-CD Aged 288 hours

Specimen Number	Tensile Strength (kN/m)	% Stretch (%)	Tensile Energy Absorption (J/m^2)	Tensile Stiffness (ET) (kN/m)
1	2.060	1.729	27.71	431.1
2	2.104	2.019	33.49	437.1
3	2.161	1.713	28.34	447.4
4	2.267	2.494	45.03	439.6
5	2.199	2.350	40.86	428.4
6	2.300	2.315	41.88	428.7
7	2.390	2.257	42.21	462.0
8	2.331	2.365	43.57	457.1
9	2.342	2.612	48.54	433.6
10	2.194	1.734	29.63	449.0
11	2.260	2.273	40.56	440.8
12	2.220	2.049	35.38	448.4
13	2.232	2.270	40.24	441.8
14	2.239	2.323	41.13	436.0
Mean:	2.236	2.179	38.47	441.5
Standard Deviation:	.091	.287	6.49	10.2

Sample I-MD Aged 288 hours

Specimen Number	Tensile Strength (kN/m)	% Stretch (%)	Tensile Energy Absorption (J/m^2)	Tensile Stiffness (ET) (kN/m)
1	5.254	1.511	52.31	714.5
2	5.204	1.506	51.97	739.0
3	5.560	1.497	54.61	743.8
4	5.503	1.668	65.02	754.1
5	5.473	1.527	54.94	721.0
6	5.638	1.605	59.29	723.2
7	5.912	1.581	61.16	757.9
8	5.599	1.542	57.02	757.4
9	5.299	1.586	55.48	730.3
10	5.656	1.497	55.18	747.5
11	5.247	1.608	56.21	687.6
12	5.304	1.439	50.64	719.9
13	4.973	1.439	47.08	695.0
14	5.421	1.495	53.07	727.5
Mean:	5.461	1.537	55.28	729.8
Standard Deviation:	.269	.064	4.50	21.9

Sample J-MD Aged 288 hours

Specimen Number	Tensile Strength (kN/m)	% Stretch (%)	Tensile Energy Absorption (J/m^2)	Tensile Stiffness (ET) (kN/m)
1	5.864	1.498	57.91	793.8
2	5.747	1.414	53.32	845.0
3	6.060	1.499	60.19	856.3
4	6.138	1.504	60.93	837.6
5	5.547	1.283	46.19	832.9
6	6.025	1.488	58.83	818.1
7	6.008	1.521	60.47	816.5
8	6.273	1.618	67.53	823.0
9	6.042	1.402	55.00	849.1
10	5.690	1.419	52.74	802.5
11	6.181	1.503	61.58	853.5
12	6.164	1.560	63.76	832.2
13	5.916	1.431	55.85	835.1
14	5.964	1.380	53.63	838.2
Mean:	5.973	1.466	57.71	831.0
Standard Deviation:	.204	.084	5.39	18.4

Sample I-CD Aged 288 hours

Specimen Number	Tensile Strength (kN/m)	% Stretch (%)	Tensile Energy Absorption (J/m^2)	Tensile Stiffness (ET) (kN/m)
1	2.006	2.491	39.61	388.6
2	2.090	3.286	54.53	367.1
3	2.175	3.127	54.44	404.0
4	1.996	2.363	37.43	387.2
5	2.111	3.023	50.78	384.8
6	2.132	3.147	53.17	377.2
7	1.958	2.590	41.06	371.1
8	2.239	3.458	62.36	397.7
9	2.074	2.677	44.33	386.4
10	2.139	3.299	56.21	381.9
11	1.998	2.624	41.46	380.7
12	1.986	2.737	43.30	371.4
13	2.107	2.964	50.38	387.2
14	2.112	3.086	52.18	375.1
Mean:	2.080	2.919	48.66	382.9
Standard Deviation:	.082	.338	7.43	10.3

Sample J-CD Aged 288 hours

Specimen Number	Tensile Strength (kN/m)	% Stretch (%)	Tensile Energy Absorption (J/m^2)	Tensile Stiffness (ET) (kN/m)
1	2.533	2.623	51.54	411.2
2	2.575	2.809	56.83	417.0
3	2.528	2.608	50.78	407.7
4	2.566	2.578	50.66	419.1
5	2.510	2.332	45.14	410.2
6	2.290	1.709	29.42	422.8
7	2.463	2.419	45.67	417.7
8	2.378	2.058	37.52	420.4
9	2.573	2.628	51.98	410.9
10	2.587	2.720	55.28	413.0
11	2.495	2.433	46.88	413.2
12	2.524	2.569	50.74	423.9
13	2.522	2.706	52.71	396.0
14	2.540	2.661	52.42	407.9
Mean:	2.506	2.490	48.40	413.6
Standard Deviation:	.082	.294	7.29	7.3

Sample K-MD Aged 288 hours

Specimen Number	Tensile Strength (kN/m)	% Stretch (%)	Tensile Energy Absorption (J/m^2)	Tensile Stiffness (ET) (kN/m)
1	3.861	1.375	34.67	543.8
2	3.896	1.525	39.58	559.1
3	4.161	1.600	43.82	511.6
4	3.996	1.670	43.99	479.6
5	3.648	1.409	33.94	528.0
6	3.913	1.413	36.42	571.5
7	3.983	1.453	38.17	523.5
8	4.117	1.662	45.57	524.5
9	3.978	1.467	38.14	517.6
10	3.956	1.513	39.00	503.5
11	4.239	1.559	43.53	543.7
12	3.609	1.279	29.99	512.6
13	3.991	1.656	43.92	489.4
14	4.035	1.545	40.69	504.5
Mean:	3.956	1.509	39.39	522.3
Standard Deviation:	.173	.117	4.56	25.6

Sample K-CD Aged 288 hours

Specimen Number	Tensile Strength (kN/m)	% Stretch (%)	Tensile Energy Absorption (J/m^2)	Tensile Stiffness (ET) (kN/m)
1	2.712	4.387	90.84	331.0
2	2.849	4.786	104.50	394.6
3	2.846	4.970	107.10	312.9
4	2.922	4.847	106.40	327.2
5	2.893	4.865	105.90	320.2
6	2.920	5.068	112.60	337.9
7	2.828	4.573	98.15	334.2
8	2.774	4.426	94.63	353.5
9	3.150	5.000	117.80	388.0
10	2.708	3.881	81.31	360.7
11	2.521	3.335	65.42	397.5
12	2.898	4.778	106.00	368.3
13	2.983	4.999	112.30	326.7
14	2.865	4.993	109.20	340.9
Mean:	2.848	4.636	100.90	349.6
Standard Deviation:	.146	.496	14.00	28.2

Sample L-MD Aged 288 hours

Specimen Number	Tensile Strength (kN/m)	% Stretch (%)	Tensile Energy Absorption (J/m^2)	Tensile Stiffness (ET) (kN/m)
1	4.817	1.229	38.92	776.0
2	5.104	1.324	44.24	758.4
3	4.569	1.050	30.93	766.3
4	5.112	1.358	46.55	774.5
5	4.739	1.273	39.72	726.0
6	5.012	1.307	43.19	785.1
7	5.004	1.356	44.91	745.0
8	4.143	1.197	32.92	689.3
9	4.830	1.315	41.68	725.2
10	4.291	1.252	35.87	716.9
11	4.799	1.327	42.22	725.9
12	5.225	1.408	49.14	796.3
13	5.264	1.315	45.52	788.5
14	4.308	1.276	36.47	702.6
Mean:	4.801	1.285	40.88	748.3
Standard Deviation:	.358	.087	5.33	34.3

Sample L-CD Aged 288 hours

Specimen Number	Tensile Strength (kN/m)	% Stretch (%)	Tensile Energy Absorption (J/m^2)	Tensile Stiffness (ET) (kN/m)
1	2.147	4.007	72.18	434.3
2	2.623	6.583	135.10	432.4
3	2.172	3.939	70.82	426.7
4	2.175	5.801	105.50	442.5
5	2.267	6.872	126.30	393.5
6	2.208	4.564	82.81	428.7
7	2.500	6.280	123.90	404.6
8	2.116	3.787	67.94	430.0
9	2.250	6.464	120.10	437.4
10	2.165	6.062	108.90	417.0
11	2.198	4.110	75.62	437.6
12	2.555	6.416	128.30	395.5
13	2.172	4.173	74.01	418.6
14	2.066	5.315	93.82	417.2
Mean:	2.258	5.312	98.95	422.6
Standard Deviation:	.172	1.162	24.89	15.6

Sample M-MD Aged 288 hours

Specimen Number	Tensile Strength (kN/m)	% Stretch (%)	Tensile Energy Absorption (J/m^2)	Tensile Stiffness (ET) (kN/m)
1	5.599	1.530	57.81	775.8
2	5.434	1.441	52.58	797.0
3	5.225	1.368	47.48	770.1
4	5.221	1.265	43.71	791.8
5	5.595	1.478	55.40	789.0
6	5.585	1.546	58.24	773.0
7	5.456	1.503	55.09	754.5
8	5.377	1.365	48.76	777.5
9	5.886	1.664	66.04	780.1
10	5.173	1.366	47.18	766.7
11	5.151	1.308	44.71	811.8
12	5.708	1.517	58.22	804.3
13	5.530	1.503	55.91	778.9
14	5.556	1.647	61.70	752.5
Mean:	5.464	1.464	53.78	780.8
Standard Deviation:	.216	.119	6.63	16.3

Sample M-CD Aged 288 hours

Specimen Number	Tensile Strength (kN/m)	% Stretch (%)	Tensile Energy Absorption (J/m^2)	Tensile Stiffness (ET) (kN/m)
1	2.137	3.753	68.07	398.7
2	1.901	2.779	44.96	390.4
3	1.991	3.093	52.90	395.3
4	2.027	3.852	67.67	394.9
5	1.937	3.296	54.63	386.1
6	2.076	3.656	64.51	398.0
7	2.060	3.896	70.00	392.0
8	2.024	3.543	62.51	388.8
9	1.939	2.593	44.02	395.8
10	2.156	4.183	78.62	385.2
11	2.053	3.118	55.74	399.1
12	2.154	4.324	80.32	402.3
13	1.996	3.434	59.46	390.4
14	2.104	4.572	82.69	385.2
Mean:	2.040	3.578	63.29	393.0
Standard Deviation:	.082	.574	12.26	5.6

ELMENDORF TEAR DATA

Elmendorf Tear, mN
Machine Direction - Aged 288 hours

Test Number	Sample A	Sample B	Sample C	Sample D	Sample E	Sample F	Sample G
1	369	345	392	400	463	345	549
2	314	330	416	400	416	353	549
3	314	337	408	392	424	345	533
4	306	353	424	384	400	353	526
5	353	337	377	384	400	369	518
6	361	345	384	400	518	345	557
7	361	345	384	377	408	369	549
8	369	337	377	392	400	369	533
9	361	353	400	400	424	384	557
10	353	353	400	384	424	377	557
Average	346.0	343.6	396.2	391.5	427.6	360.9	542.9
Std. Dev.	24.7	8.1	16.2	8.6	36.8	14.3	14.2

Cross Direction - Aged 288 hours

1	416	424	486	439	533	486	581
2	455	392	471	455	533	455	588
3	400	400	494	431	518	479	581
4	377	408	486	439	533	431	612
5	408	424	486	455	549	471	581
6	392	439	502	439	533	439	596
7	408	408	486	431	518	439	604
8	416	416	479	424	557	471	612
9	447	424	486	439	565	416	581
10	424	447	471	431	557	431	565
Average	414.2	418.2	484.8	438.6	539.8	451.9	590.0
Std. Dev.	23.6	17.0	9.6	10.1	16.5	23.7	15.6

ELMENDORF TEAR DATA

Elmendorf Tear, mN

Machine Direction - Aged 288 hours

Test Number	Sample H	Sample I	Sample J	Sample K	Sample L	Sample M
1	235	306	337	361	408	377
2	228	298	290	369	408	377
3	220	306	314	361	416	392
4	220	298	306	353	400	384
5	212	298	298	384	408	392
6	235	282	290	369	400	392
7	220	282	290	384	400	392
8	235	298	298	361	408	377
9	220	298	290	361	377	384
10	235	282	298	361	400	377
Average	225.9	295.0	301.3	366.4	402.5	385.3
Std. Dev.	8.9	9.2	14.9	10.5	10.5	7.4

Cross Direction - Aged 288 hours

1	306	384	369	408	431	447
2	298	361	384	408	439	463
3	298	361	377	392	424	439
4	314	361	377	392	439	455
5	314	361	424	408	439	471
6	251	369	392	408	392	463
7	298	377	424	400	424	471
8	298	369	377	400	424	479
9	330	384	408	392	431	455
10	330	377	369	384	455	471
Average	303.6	370.3	389.9	399.3	429.9	461.3
Std. Dev.	22.2	9.6	21.3	8.6	16.5	12.2

MIT FOLD DATA

MIT Fold, log(10)N
Sample A Machine Direction - Aged 288 Hours

Sheet Number	Test 1	Test 2	Test 3	Test 4	Test 5	Test 6	Average
1	2.41	2.40	2.27	2.24	2.23	2.46	2.34
2	2.13	2.31	2.69	2.18	1.91	2.42	2.27
3	2.22	2.42	2.12	2.42	2.21	2.26	2.28
4	2.23	2.41	2.54	2.18	2.01	2.49	2.31
5	2.46	2.21	2.44	2.55	2.54	2.56	2.46
6	2.93	2.36	2.34	2.65	2.44	2.48	2.53
7	2.31	2.29	1.93	2.55	2.28	2.17	2.25
8	2.53	2.43	2.35	2.58	2.43	2.44	2.46
9	2.49	2.42	2.30	2.61	2.42	2.30	2.42
10	2.04	1.32	2.11	2.27	2.42	2.59	2.13
11	2.25	2.09	2.41	2.41	2.33	2.41	2.32
12	2.45	2.25	2.52	2.48	2.38	2.50	2.43
13	2.40	2.23	2.45	2.58	2.37	2.63	2.44
14	2.34	2.34	2.42	2.43	2.55	2.45	2.42
Average							2.362
Std. Dev.							0.109

Sample A Cross Direction - Aged 288 Hours

Sheet Number	Test 1	Test 2	Test 3	Test 4	Test 5	Test 6	Average
1	2.07	2.02	2.32	1.79	2.20	2.25	2.11
2	2.17	2.42	2.50	1.91	2.03	2.19	2.20
3	2.36	2.07	2.29	2.20	2.04	2.19	2.19
4	2.12	1.91	2.08	2.19	2.12	2.04	2.08
5	2.06	1.94	2.18	2.07	2.19	2.11	2.09
6	1.92	1.88	2.03	2.27	2.21	2.22	2.09
7	1.88	1.76	1.65	2.00	2.09	2.40	1.96
8	2.27	2.10	1.81	1.93	2.26	2.16	2.09
9	2.02	2.14	2.12	2.08	2.02	1.84	2.04
10	2.26	1.96	2.20	1.48	1.98	1.86	1.96
11	2.24	2.20	2.02	1.79	2.07	1.76	2.01
12	1.98	1.60	2.09	1.76	1.66	2.09	1.86
13	2.05	1.97	2.23	2.06	1.63	1.52	1.91
14	2.12	2.18	2.24	2.29	1.67	1.79	2.05
Average							2.045
Std. Dev.							0.097

MIT FOLD DATA

MIT Fold, log(10)N
Sample B Machine Direction - 288 Hours

Sheet Number	Test 1	Test 2	Test 3	Test 4	Test 5	Test 6	Average
1	2.06	1.91	2.20	2.19	1.88	2.06	2.05
2	1.98	2.00	2.21	2.36	1.94	2.21	2.12
3	1.98	1.89	1.95	2.12	1.94	1.86	1.96
4	2.29	2.23	1.98	2.04	1.92	2.14	2.10
5	2.10	1.83	1.78	2.31	1.79	1.82	1.94
6	1.91	2.06	1.71	1.62	1.96	2.10	1.89
7	1.93	2.01	1.99	2.04	1.73	2.26	2.00
8	1.80	1.85	1.98	1.59	1.85	2.08	1.86
9	2.17	1.86	1.88	1.36	2.10	2.28	1.94
10	2.26	2.08	1.92	2.15	1.83	1.91	2.02
11	2.07	2.36	2.01	1.87	2.00	1.73	2.01
12	2.04	1.92	1.67	1.15	1.76	1.69	1.70
13	2.21	1.94	1.90	1.49	1.81	2.05	1.90
14	1.97	1.77	2.20	1.30	2.07	1.57	1.81
Average							1.950
Std. Dev.							0.113

Sample B Cross Direction - Aged 288 Hours

Sheet Number	Test 1	Test 2	Test 3	Test 4	Test 5	Test 6	Average
1	1.53	1.49	1.80	1.74	1.66	1.99	1.70
2	1.41	1.51	1.79	1.51	1.57	1.79	1.60
3	1.57	1.38	1.57	1.78	1.63	1.57	1.58
4	1.83	1.69	1.84	1.85	1.79	1.86	1.81
5	1.52	1.52	1.70	1.18	1.65	1.49	1.51
6	1.64	1.72	1.85	1.86	1.70	1.89	1.78
7	1.30	1.57	1.40	1.48	1.64	1.58	1.49
8	1.23	1.68	1.20	1.67	1.41	1.52	1.45
9	1.66	1.94	1.43	1.92	1.41	1.72	1.68
10	1.86	1.90	1.79	1.46	1.86	1.62	1.75
11	1.76	1.36	1.45	1.72	1.53	1.64	1.58
12	1.74	1.84	1.72	1.54	1.66	1.54	1.67
13	1.90	1.58	1.40	1.67	1.40	1.38	1.55
14	1.60	1.38	1.23	1.57	1.48	1.65	1.49
Average							1.618
Std. Dev.							0.115

MIT FOLD DATA

MIT Fold, log(10)N
Sample C Machine Direction - Aged 288 Hours

Sheet Number	Test 1	Test 2	Test 3	Test 4	Test 5	Test 6	Average
1	2.46	2.56	2.51	2.56	2.51	2.57	2.53
2	2.46	2.41	2.51	2.66	2.40	2.53	2.49
3	2.11	2.35	2.58	2.37	2.48	2.40	2.38
4	2.52	2.38	2.44	2.59	2.53	2.61	2.51
5	2.36	2.51	2.49	2.53	2.51	2.62	2.50
6	2.41	1.74	2.48	2.63	2.56	2.44	2.38
7	2.06	2.52	1.88	2.48	2.33	2.40	2.28
8	2.50	2.52	2.38	2.61	2.28	2.39	2.45
9	2.38	2.13	1.81	2.39	2.47	2.14	2.22
10	2.28	2.52	2.46	2.51	2.44	2.44	2.44
11	2.41	2.43	2.40	2.46	1.93	2.37	2.33
12	2.47	2.35	2.46	2.49	2.19	2.43	2.40
13	2.52	2.27	2.34	2.50	2.14	2.44	2.37
14	2.39	2.61	2.41	1.97	2.16	2.47	2.33
Average							2.401
Std. Dev.							0.092

Sample C Cross Direction - Aged 288 Hours

Sheet Number	Test 1	Test 2	Test 3	Test 4	Test 5	Test 6	Average
1	2.02	1.52	1.96	2.03	1.79	2.04	1.89
2	1.96	2.05	2.04	2.12	1.96	1.71	1.97
3	1.72	2.00	1.79	1.96	1.73	1.98	1.86
4	1.99	1.68	1.89	2.02	1.90	1.86	1.89
5	1.92	1.86	1.85	1.91	1.75	1.71	1.83
6	1.84	1.84	1.86	1.86	1.72	1.86	1.83
7	1.97	2.00	1.89	2.06	2.10	1.68	1.95
8	1.96	1.96	2.04	1.78	1.93	1.90	1.93
9	2.00	2.04	1.87	1.88	1.85	1.72	1.89
10	1.93	1.72	1.89	1.89	1.91	1.79	1.85
11	1.89	2.20	1.83	1.87	2.00	1.94	1.95
12	1.79	1.88	1.90	1.90	1.73	1.64	1.81
13	1.80	1.83	1.83	1.11	1.78	1.90	1.71
14	1.83	2.00	1.89	1.86	1.51	1.77	1.81
Average							1.870
Std. Dev.							0.072

MIT FOLD DATA

MIT Fold, log(10)N
Sample D Machine Direction - Aged 288 Hours

Sheet Number	Test 1	Test 2	Test 3	Test 4	Test 5	Test 6	Average
1	1.90	2.35	2.31	2.38	2.53	2.24	2.29
2	1.38	1.81	1.56	2.33	2.23	2.00	1.89
3	2.21	2.25	2.18	2.34	1.72	2.48	2.20
4	2.29	2.11	2.34	2.41	2.31	2.19	2.27
5	1.89	1.91	2.18	2.39	2.13	2.41	2.15
6	2.42	2.22	1.88	2.25	2.34	2.40	2.25
7	2.20	2.20	2.19	2.21	2.34	2.20	2.22
8	2.20	2.25	2.19	2.35	1.91	2.23	2.19
9	1.79	2.13	2.12	2.17	2.04	2.18	2.07
10	2.26	2.18	2.20	2.33	2.54	2.17	2.28
11	2.36	2.40	2.12	2.16	2.52	1.89	2.24
12	2.26	2.21	2.23	2.26	2.30	2.26	2.25
13	2.46	2.37	1.87	2.14	2.36	2.29	2.25
14	2.11	2.45	2.11	2.40	2.26	2.53	2.31
Average							2.205
Std. Dev.							0.110

Sample D Cross Direction - Aged 288 Hours

Sheet Number	Test 1	Test 2	Test 3	Test 4	Test 5	Test 6	Average
1	1.97	1.90	1.69	2.17	2.21	1.89	1.97
2	2.03	2.21	2.12	2.12	1.97	2.11	2.10
3	1.63	2.10	1.94	1.79	1.87	1.96	1.88
4	2.10	1.88	1.93	1.97	2.20	2.04	2.02
5	1.88	1.99	2.03	2.05	1.91	1.83	1.95
6	2.06	1.93	2.00	2.05	2.12	2.01	2.03
7	2.14	1.95	2.03	1.85	1.95	1.95	1.98
8	1.97	1.87	1.99	1.99	2.01	1.96	1.96
9	2.10	1.97	1.94	2.00	1.92	1.86	1.97
10	1.93	1.65	1.89	1.99	1.78	1.78	1.84
11	2.24	1.85	1.94	1.69	2.08	1.87	1.95
12	1.94	1.85	1.97	2.09	1.70	1.94	1.92
13	2.10	1.83	1.94	1.86	2.11	1.94	1.97
14	2.12	1.95	1.98	1.96	1.95	1.88	1.98
Average							1.964
Std. Dev.							0.063

MIT FOLD DATA

MIT Fold, log(10)N
Sample E Machine Direction - Aged 288 Hours

Test 1	Test 2	Test 3	Test 4	Test 5	Test 6	Average
2.87	2.80	2.79	2.82	2.70	2.65	2.77
2.76	2.50	2.56	2.63	2.62	2.67	2.62
2.56	2.66	2.30	2.56	2.70	2.72	2.58
2.71	2.73	2.59	2.27	2.70	2.34	2.56
2.62	2.67	2.63	2.79	2.50	2.55	2.63
2.85	2.66	2.53	2.59	2.81	2.74	2.70
2.71	2.54	2.69	2.66	2.57	2.76	2.66
2.52	2.64	2.76	2.72	2.62	2.63	2.65
2.69	2.71	2.66	2.55	2.66	2.53	2.63
2.63	2.55	2.87	2.65	2.66	2.63	2.66
2.76	2.65	2.58	2.65	2.74	2.69	2.68
2.77	2.50	2.58	2.61	2.81	2.69	2.66
2.68	2.61	2.48	2.81	2.63	2.54	2.63
2.68	2.78	2.63	2.44	2.66	2.70	2.65
						2.648
						0.051

Sample E Cross Direction - Aged 288 Hours

Test 1	Test 2	Test 3	Test 4	Test 5	Test 6	Average
1.78	1.97	1.73	1.79	1.89	1.85	1.83
1.65	1.91	1.82	1.76	1.90	1.67	1.79
1.80	1.76	1.78	1.94	1.98	1.65	1.82
1.88	1.81	1.81	1.72	1.75	1.85	1.80
1.84	1.61	1.93	2.03	1.89	1.97	1.88
1.88	1.85	1.98	1.79	1.88	1.98	1.89
1.79	1.87	1.94	1.97	2.04	1.93	1.93
1.84	1.90	1.85	1.69	1.76	1.52	1.76
1.86	1.86	1.88	1.94	1.94	1.92	1.90
1.80	1.85	1.78	1.78	1.90	2.07	1.86
1.98	1.89	1.89	1.83	1.68	1.76	1.84
1.92	1.85	1.92	1.99	1.95	2.05	1.95
1.93	1.60	1.88	1.81	1.94	1.92	1.85
1.95	1.87	1.77	2.07	1.92	1.74	1.89
						1.855
						0.054

MIT FOLD DATA

MIT Fold, log(10)N
Sample F Machine Direction - Aged 288 Hours

Sheet Number	Test 1	Test 2	Test 3	Test 4	Test 5	Test 6	Average
1	1.00	1.11	1.04	1.04	1.00	1.15	1.06
2	1.11	1.15	1.15	1.15	1.00	1.11	1.11
3	1.04	0.78	1.08	1.08	0.85	1.04	0.98
4	0.95	1.00	1.04	1.18	1.00	1.00	1.03
5	1.20	0.78	1.15	1.26	0.95	1.20	1.09
6	1.08	0.90	1.04	1.00	1.11	0.95	1.02
7	1.08	1.04	1.04	1.18	1.04	1.08	1.08
8	1.08	1.11	1.04	1.00	1.00	1.04	1.05
9	1.08	0.95	1.04	1.11	0.95	1.08	1.04
10	1.11	0.85	1.04	1.04	0.90	1.00	0.99
11	1.00	1.00	1.11	1.15	1.11	0.95	1.05
12	1.04	0.95	0.78	1.04	0.90	1.08	0.97
13	0.95	0.90	1.04	0.95	1.04	1.04	0.99
14	1.08	0.85	1.00	1.04	1.04	1.11	1.02
Average							1.033
Std. Dev.							0.043

Sample F Cross Direction - Aged 288 Hours

Sheet Number	Test 1	Test 2	Test 3	Test 4	Test 5	Test 6	Average
1	1.08	0.90	1.00	0.95	0.95	1.04	0.99
2	1.04	0.90	0.95	0.95	1.00	1.00	0.98
3	1.08	1.00	0.95	1.00	0.85	0.90	0.96
4	1.04	0.78	1.00	1.00	0.85	0.95	0.94
5	1.08	0.90	1.00	0.90	1.00	1.00	0.98
6	1.04	0.95	1.00	1.04	0.90	0.95	0.98
7	0.90	0.85	1.04	1.08	0.90	0.95	0.95
8	1.08	0.95	0.95	1.00	0.95	0.95	0.98
9	1.04	0.85	1.00	1.04	0.85	0.95	0.95
10	0.90	0.85	1.00	0.95	0.95	1.04	0.95
11	1.00	0.90	0.95	0.90	0.78	0.78	0.89
12	1.15	0.90	0.90	1.04	0.95	1.00	0.99
13	0.95	0.85	0.95	0.95	0.95	1.00	0.94
14	1.00	0.90	1.00	1.15	0.95	1.08	1.01
Average							0.965
Std. Dev.							0.031

MIT FOLD DATA

MIT Fold, log(10)N
Sample G Machine Direction - Aged 288 Hours

Sheet Number	Test 1	Test 2	Test 3	Test 4	Test 5	Test 6	Average
1	1.86	1.70	1.87	1.75	1.65	1.82	1.78
2	1.90	1.71	1.76	1.81	1.67	1.48	1.72
3	1.81	1.69	1.86	1.66	1.89	1.75	1.78
4	1.69	1.80	1.66	1.65	1.76	1.76	1.72
5	1.66	1.89	1.68	1.78	1.81	1.72	1.76
6	1.86	1.48	1.69	1.63	1.76	1.66	1.68
7	1.59	1.70	1.66	1.72	1.94	1.95	1.76
8	1.80	1.76	1.99	1.87	1.78	1.59	1.80
9	1.86	1.85	1.79	1.83	1.81	1.78	1.82
10	1.79	1.71	1.79	1.74	1.77	1.74	1.76
11	1.94	1.78	1.59	1.59	1.64	1.58	1.69
12	1.86	1.61	1.71	1.90	1.93	1.72	1.79
13	1.54	1.62	1.72	1.81	1.77	1.72	1.70
14	1.89	1.60	1.75	1.81	1.85	1.89	1.80
Average							1.753
Std. Dev.							0.044

Sample G Cross Direction - Aged 288 Hours

Sheet Number	Test 1	Test 2	Test 3	Test 4	Test 5	Test 6	Average
1	1.43	1.30	1.48	1.34	1.34	1.40	1.38
2	1.32	1.57	1.36	1.48	1.49	1.23	1.41
3	1.40	1.49	1.28	1.49	1.51	1.32	1.41
4	1.40	1.51	1.32	1.49	1.58	1.36	1.44
5	1.40	1.54	1.40	1.49	1.53	1.40	1.46
6	1.36	1.64	1.36	1.51	1.41	1.34	1.44
7	1.52	1.49	1.45	1.46	1.41	1.38	1.45
8	1.51	1.45	1.32	1.45	1.46	1.46	1.44
9	1.54	1.52	1.32	1.40	1.40	1.38	1.43
10	1.48	1.48	1.36	1.40	1.45	1.40	1.43
11	1.40	1.57	1.53	1.49	1.51	1.52	1.50
12	1.56	1.45	1.36	1.41	1.60	1.23	1.44
13	1.51	1.59	1.30	1.40	1.48	1.26	1.42
14	1.45	1.48	1.38	1.38	1.62	1.28	1.43
Average							1.435
Std. Dev.							0.027

MIT FOLD DATA

MIT Fold, log(10)N
Sample H Machine Direction - Aged 288 Hours

Sheet Number	Test 1	Test 2	Test 3	Test 4	Test 5	Test 6	Average
1	1.66	2.16	1.74	2.14	1.48	1.43	1.77
2	1.83	1.79	1.86	1.69	1.70	1.46	1.72
3	2.00	1.85	1.75	1.49	1.46	1.48	1.67
4	1.86	1.56	2.04	1.74	1.72	1.81	1.79
5	1.88	1.87	1.40	2.13	1.53	1.83	1.77
6	2.07	1.82	1.97	2.01	1.81	1.57	1.88
7	1.92	2.00	1.79	1.89	1.67	2.03	1.88
8	1.69	2.05	2.02	2.11	1.48	1.56	1.82
9	1.74	1.78	1.58	1.98	1.94	1.91	1.82
10	2.00	1.53	1.46	2.08	1.54	1.76	1.73
11	2.15	2.00	1.46	1.93	1.76	1.84	1.86
12	2.09	2.04	1.95	1.85	1.52	1.56	1.84
13	1.91	1.75	2.03	1.84	1.71	1.41	1.78
14	1.78	1.61	1.72	1.79	1.74	1.64	1.71
Average							1.788
Std. Dev.							0.064

Sample H Cross Direction - Aged 288 Hours

Sheet Number	Test 1	Test 2	Test 3	Test 4	Test 5	Test 6	Average
1	1.78	1.53	1.65	1.66	1.57	1.38	1.60
2	2.01	1.52	1.69	1.51	1.28	1.74	1.62
3	2.13	1.60	1.76	1.66	1.90	1.62	1.78
4	1.87	1.57	1.79	1.81	1.61	1.36	1.67
5	1.93	1.78	1.45	1.53	1.69	1.57	1.66
6	1.71	1.70	1.57	1.41	1.63	1.71	1.62
7	1.57	1.57	1.67	1.72	1.64	1.60	1.63
8	1.82	1.40	1.89	1.73	1.80	1.75	1.73
9	1.82	1.30	1.85	1.56	1.76	1.71	1.67
10	1.28	1.52	1.45	1.94	1.48	1.81	1.58
11	1.56	1.49	1.56	1.49	1.85	1.67	1.60
12	1.85	1.32	1.60	1.65	1.18	1.52	1.52
13	1.91	1.51	1.67	1.81	1.15	1.51	1.59
14	1.88	1.69	1.18	1.95	1.49	1.52	1.62
Average							1.635
Std. Dev.							0.064

MIT FOLD DATA

MIT Fold, log(10)N
Sample I Machine Direction - Aged 288 Hours

Sheet Number	Test 1	Test 2	Test 3	Test 4	Test 5	Test 6	Average
1	1.90	1.84	2.24	1.99	2.23	2.19	2.07
2	2.09	2.08	1.90	2.16	1.72	2.09	2.01
3	2.13	2.31	2.13	2.21	2.22	2.17	2.20
4	2.17	2.01	2.00	2.09	1.96	1.83	2.01
5	2.24	2.01	2.10	2.31	2.05	2.06	2.13
6	2.18	1.98	2.06	2.23	1.91	2.14	2.08
7	2.07	2.29	2.25	2.01	2.35	1.91	2.15
8	2.33	2.08	2.11	2.26	2.29	2.14	2.20
9	2.11	2.25	2.03	2.11	2.36	1.98	2.14
10	2.22	2.10	2.28	1.66	1.99	2.07	2.05
11	2.36	2.08	2.14	2.45	2.02	2.02	2.18
12	2.03	2.13	2.11	1.96	2.24	2.35	2.14
13	2.29	2.29	2.05	2.08	2.15	1.86	2.12
14	2.25	2.20	2.06	2.16	1.88	1.95	2.08
Average							2.111
Std. Dev.							0.063

Sample I Cross Direction - Aged 288 Hours

Sheet Number	Test 1	Test 2	Test 3	Test 4	Test 5	Test 6	Average
1	2.00	1.76	1.62	1.74	1.59	1.79	1.75
2	1.77	1.86	1.88	1.87	1.60	1.66	1.77
3	1.53	2.03	1.48	1.83	1.83	2.00	1.78
4	2.03	1.69	1.64	1.79	1.59	1.68	1.74
5	2.06	1.67	1.76	1.79	1.60	1.57	1.74
6	1.86	1.72	1.58	1.43	1.65	1.84	1.68
7	1.99	1.60	1.38	1.84	1.68	1.75	1.71
8	2.09	1.49	1.57	1.82	1.85	1.84	1.78
9	1.51	1.20	1.69	1.96	1.67	1.61	1.61
10	1.57	2.00	1.65	1.86	1.67	1.88	1.77
11	1.60	1.72	1.62	2.00	1.73	1.68	1.73
12	2.01	1.48	1.78	1.98	1.97	1.81	1.84
13	1.57	1.64	2.10	1.53	1.57	1.54	1.66
14	1.78	1.67	1.70	1.62	1.52	1.46	1.63
Average							1.727
Std. Dev.							0.065

MIT FOLD DATA

MIT Fold, log(10)N
Sample J Machine Direction - Aged 288 Hours

Sheet Number	Test 1	Test 2	Test 3	Test 4	Test 5	Test 6	Average
1	2.42	2.11	2.12	2.35	2.30	2.05	2.22
2	2.17	2.05	2.01	2.35	2.06	2.12	2.13
3	2.39	1.99	2.23	2.11	1.99	2.18	2.15
4	2.10	2.15	2.22	2.10	2.25	2.14	2.16
5	2.07	2.18	2.10	2.11	1.93	2.25	2.11
6	2.35	1.88	2.23	2.18	1.94	2.16	2.12
7	2.00	1.70	2.08	2.04	2.45	2.14	2.07
8	2.24	2.08	2.26	2.28	1.94	1.92	2.12
9	2.30	2.20	2.26	2.38	1.96	2.08	2.20
10	2.13	2.29	2.35	2.09	2.37	2.16	2.23
11	2.03	2.20	2.04	2.15	2.16	2.11	2.11
12	2.17	1.82	2.10	2.09	2.33	2.27	2.13
13	2.15	2.41	2.33	2.42	2.25	2.08	2.27
14	2.22	2.40	1.99	1.83	1.99	1.77	2.03
Average							2.147
Std. Dev.							0.065

Sample J Cross Direction - Aged 288 Hours

Sheet Number	Test 1	Test 2	Test 3	Test 4	Test 5	Test 6	Average
1	1.95	1.59	1.52	1.78	1.66	1.53	1.67
2	1.40	1.76	1.98	1.83	1.48	1.62	1.68
3	1.69	1.64	1.60	1.36	1.76	1.76	1.63
4	1.51	1.68	1.86	1.69	1.63	1.71	1.68
5	1.57	1.85	1.68	1.46	1.40	1.66	1.60
6	1.85	1.52	1.53	1.52	1.70	1.90	1.67
7	1.64	1.34	1.52	1.52	1.51	1.58	1.52
8	1.66	1.57	1.67	1.56	1.66	1.54	1.61
9	1.99	1.53	1.69	1.41	1.64	1.76	1.67
10	1.74	1.59	1.66	1.59	1.48	1.49	1.59
11	1.23	1.36	1.79	1.46	1.72	1.86	1.57
12	1.58	1.46	1.89	1.79	1.91	1.61	1.71
13	1.74	1.56	1.72	1.91	1.58	1.67	1.70
14	1.62	1.92	1.88	1.28	1.52	1.83	1.68
Average							1.642
Std. Dev.							0.055

MIT FOLD DATA

MIT Fold, log(10)N
Sample K Machine Direction - Aged 288 Hours

Sheet Number	Test 1	Test 2	Test 3	Test 4	Test 5	Test 6	Average
1	1.90	1.62	1.54	1.68	1.57	1.43	1.62
2	1.26	1.46	1.45	1.66	1.15	1.51	1.41
3	1.48	1.63	1.81	1.54	1.95	1.56	1.66
4	1.63	1.68	1.93	1.32	1.91	1.49	1.66
5	1.71	1.32	1.64	1.38	1.62	1.62	1.55
6	1.61	1.52	1.64	1.46	1.63	1.32	1.53
7	1.92	1.65	1.46	1.84	1.95	1.26	1.68
8	1.78	1.49	1.60	1.79	1.72	1.67	1.68
9	1.90	1.52	1.62	1.60	1.57	1.71	1.65
10	1.85	1.92	1.96	1.26	1.15	1.98	1.69
11	1.65	1.41	1.87	1.71	1.49	1.64	1.63
12	1.57	1.38	1.43	1.41	1.38	1.36	1.42
13	1.62	1.66	1.67	1.36	1.54	1.70	1.59
14	1.77	1.41	1.63	1.26	1.75	1.65	1.58
Average							1.597
Std. Dev.							0.090

Sample K Cross Direction - Aged 288 Hours

Sheet Number	Test 1	Test 2	Test 3	Test 4	Test 5	Test 6	Average
1	2.05	1.97	1.94	1.89	1.84	2.00	1.95
2	1.71	2.00	2.18	1.84	1.81	2.01	1.93
3	1.84	1.83	1.89	1.94	1.94	1.84	1.88
4	1.79	1.95	1.60	2.09	2.00	2.25	1.95
5	2.20	1.87	2.17	2.11	1.93	2.04	2.05
6	2.03	2.23	2.04	1.69	2.19	2.21	2.06
7	2.05	1.99	1.94	1.86	2.06	2.03	1.99
8	2.01	1.88	2.09	2.29	2.03	2.33	2.10
9	2.14	2.23	1.96	2.18	2.19	1.86	2.09
10	2.08	1.83	1.94	1.98	2.01	1.76	1.93
11	2.19	2.04	1.94	2.22	1.98	1.76	2.02
12	2.28	1.81	2.10	2.21	1.99	1.91	1.66
13	2.05	2.07	2.08	1.90	1.82	1.66	1.93
14	1.85	2.18	2.16	2.06	1.76	1.81	1.97
Average							1.966
Std. Dev.							0.111

MIT FOLD DATA

MIT Fold, log(10)N
Sample L Machine Direction - Aged 288 Hours

Sheet Number	Test 1	Test 2	Test 3	Test 4	Test 5	Test 6	Average
1	2.03	1.04	2.39	2.30	1.92	2.36	2.01
2	2.35	1.96	2.34	2.02	2.31	2.36	2.22
3	2.31	2.18	1.99	2.22	2.36	2.38	2.24
4	2.34	1.93	2.24	2.22	2.29	2.29	2.22
5	2.02	2.15	1.96	2.16	2.46	2.00	2.13
6	2.08	2.12	2.39	2.32	2.08	2.31	2.22
7	2.33	2.18	2.24	2.33	1.70	2.18	2.16
8	2.36	2.26	2.31	2.11	2.08	2.16	2.21
9	1.95	2.05	2.06	2.19	2.34	2.14	2.12
10	2.18	2.06	2.31	2.33	2.11	2.24	2.21
11	2.28	2.26	2.01	2.23	2.28	2.28	2.22
12	2.40	1.82	2.17	2.34	2.21	2.21	2.19
13	2.03	2.23	1.87	2.11	2.22	2.29	2.12
14	2.08	1.99	2.01	2.31	2.28	1.60	2.04
Average							2.165
Std. Dev.							0.072

Sample L Cross Direction - Aged 288 Hours

Sheet Number	Test 1	Test 2	Test 3	Test 4	Test 5	Test 6	Average
1	2.22	2.22	2.11	2.21	2.18	2.18	2.19
2	2.35	2.17	2.21	2.41	2.25	2.21	2.27
3	1.86	2.00	2.10	2.26	2.40	2.28	2.15
4	2.25	2.07	2.28	2.27	2.13	2.03	2.17
5	2.32	2.08	2.39	2.36	1.92	2.12	2.20
6	2.39	2.26	2.10	2.06	2.16	1.76	2.12
7	1.91	2.26	2.16	2.29	2.13	2.13	2.15
8	2.07	2.23	2.14	1.89	2.34	2.09	2.13
9	2.21	2.03	2.03	2.15	2.17	2.00	2.10
10	2.28	2.27	2.11	2.22	2.20	1.96	2.17
11	2.05	2.08	2.06	2.06	2.16	2.30	2.12
12	2.11	2.15	2.21	2.26	2.03	2.29	2.18
13	2.32	2.26	2.27	2.16	2.12	1.92	2.18
14	2.33	2.25	2.22	1.77	2.16	2.07	2.13
Average							2.160
Std. Dev.							0.042

MIT FOLD DATA

MIT Fold, log(10)N
Sample M Machine Direction - Aged 288 Hours

Sheet Number	Test 1	Test 2	Test 3	Test 4	Test 5	Test 6	Average
1	2.23	2.25	2.21	2.18	1.86	1.88	2.10
2	2.07	1.41	1.68	2.38	2.11	2.44	2.02
3	2.03	2.29	1.94	2.29	2.36	2.07	2.17
4	2.19	2.14	1.99	2.01	2.13	2.17	2.10
5	2.35	2.29	1.95	2.20	2.09	2.18	2.18
6	1.81	2.39	1.81	1.94	2.20	2.20	2.06
7	2.06	2.28	1.94	1.99	2.12	2.37	2.13
8	2.34	2.25	2.28	2.31	2.00	1.74	2.15
9	2.26	2.39	2.05	2.09	2.06	1.93	2.13
10	2.05	2.42	1.98	2.33	1.99	2.40	2.20
11	2.24	2.19	2.34	2.26	2.12	1.64	2.13
12	2.24	2.23	2.09	2.28	2.14	1.77	2.12
13	2.35	2.09	2.15	2.28	1.77	2.18	2.14
14	2.20	2.11	1.97	2.04	2.36	2.10	2.13
Average							2.125
Std. Dev.							0.046

Sample M Cross Direction - Aged 288 Hours

Sheet Number	Test 1	Test 2	Test 3	Test 4	Test 5	Test 6	Average
1	1.94	1.70	1.78	1.86	1.85	1.83	1.83
2	1.92	1.69	2.02	1.81	1.84	1.61	1.82
3	1.92	1.67	1.90	1.41	1.79	1.83	1.75
4	1.93	1.96	1.56	1.90	1.84	1.89	1.85
5	1.88	1.84	1.74	1.88	1.62	1.92	1.81
6	1.57	1.92	1.66	1.70	1.74	1.79	1.73
7	1.67	1.52	1.72	2.01	1.65	1.67	1.71
8	1.76	1.72	2.03	1.80	1.92	1.76	1.83
9	2.05	1.93	2.00	1.77	1.78	1.60	1.86
10	1.96	1.96	1.97	2.00	1.90	2.10	1.98
11	1.75	1.95	1.65	1.87	1.48	1.99	1.78
12	1.85	1.93	1.62	1.99	1.75	1.88	1.84
13	1.69	1.88	1.98	1.74	1.83	1.68	1.80
14	1.66	1.87	1.57	2.10	1.61	1.77	1.76
Average							1.810
Std. Dev.							0.067